REMARKS

This application has been carefully reviewed in light of the Office Action dated February 13, 2003. Claims 1 and 3 to 10 are in the application, of which Claims 1, 3 and 7 have been amended. Claim 1 is the sole independent claim. Reconsideration and further examination are respectfully requested.

In the Office Action, Claims 1, 3 to 5, 7 and 8 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 3,610,811 (O'Keefe); and Claims 1 and 3 to 10 were rejected under 35 U.S.C. § 103(a) over O'Keefe in view of U.S. Patent No. 5,730,932 (Sarkhel).

The invention concerns a printed wiring board which includes a substrate having two opposite surfaces, and a plurality of soldering through holes formed in the substrate, so as to open the opposite surfaces for inserting leads of an inserted component to be mounted onto the printed wiring board and for soldering the inserted component onto the substrate. Each of the plurality of soldering through holes has an inner peripheral surface and a pair of lands each formed continuously across the opposite surfaces, and an inner peripheral surface corresponding to each of the plurality of soldering through holes. At least one land of the pair of lands is connected to at least one wiring pattern. Additionally, the printed wiring board has a connection state maintaining means for maintaining a connection portion between the surface of each of the lands to which the wiring pattern is connected and the wiring pattern, in a state not wetted by solder, and for maintaining the printed wiring board, except for the connection portion, in a state wetted by solder.

Thus, among the many features of the invention is a connection state maintaining means for maintaining a connection portion between the surface of the lands to which the wiring pattern is connected and the wiring pattern in a state not wetted by solder, and for maintaining the printed wiring board, except for the connection portion, in a state wetted by solder. To its advantage, the invention helps reduce the incidence of breakage of the wiring pattern caused by stress on each of the pairs of lands during soldering. In addition, the strength of the interface between an inserted component and the substrate can be maintained.

O'Keefe is seen to disclose the assembly of electric circuits where circuit components are soldered to circuit boards having conductive and insulative layers. Col. 1, lines 5 to 8. More particularly, O'Keefe is seen to disclose a circuit board with a plurality of plated through holes with solder resist covering at least a portion of the circuit board surface along the perimeter of each plated through hole. Col. 2, lines 40 to 51. Specifically, the circuit board 10 includes aperture 30, which has mounting pads 26 formed from conductive layers 50, and insulative panel 18, having printed circuitry. Col. 3, line 48 to Col. 4, line 30. The solder resist pattern includes a solid coating of resist on the entire surface of the circuit board, thereby providing solder resist along the entire surface perimeter of each plated through hole. Col. 2, lines 63 to 66.

The Office Action refers to O'Keefe's column 4, which mentions patterns of stripes 14 formed by silk screening. In O'Keefe, stripes of solder resist are arranged in parallel relationship with one another and spaced a predetermined uniform distance apart to form an array of stripes on the printed circuit board. Col. 4, lines 38 to 45; Figures 1 and 2. Using this technique, stripes are preferably arranged such that they preferably overlap to some degree or are at least tangential to apertures 30 in the surface of the circuit board

around each of the plated-through holes. Col. 4, lines 45 to 52. The result of this method is a striped pattern across or tangential to the plated-through holes which provides solder resist on portions of the surface perimeter of the hole, in order to serve as escape paths or ports for gasses generated within the hole during the soldering process. Col. 4, lines 52 to 57; Figure 4. As such, O'Keefe is not seen to disclose or suggest connection maintaining means for maintaining a connection portion between the surface of each of the plurality of lands to which the wiring pattern is connected and the wiring pattern in a state not wetted by solder, and for maintaining the printed wiring board, except for the connection portion, in a state wetted by solder.

Sarkhel, either alone or in combination with O'Keefe, is not understood to disclose or suggest anything to remedy the foregoing deficiencies of O'Keefe. Specifically, Sarkhel is seen to disclose lead-free, low toxicity solder alloys that are particularly useful in microelectronic applications. Col. 1, lines 6 to 8. Specifically, Sarkhel is seen to disclose a solder alloy which contains a major portion of tin, and effective amounts of silver, bismuth and indium. Col. 2, lines 54 to 56. This lead-free solder is seen to wet and form a chemically and thermally stable bond, with the bonding materials commonly used in electronic fabrication. Col. 2, lines 45 to 49. Nowhere, however does Sarkhel remotely disclose or suggest a connection maintaining means for maintaining a connection portion between the surface of each of the plurality of lands to which the wiring pattern is connected and the wiring pattern, in a state not wetted by solder, and for maintaining the printed wiring board, except for the connection portion, in a state wetted by solder.

Accordingly, based on the foregoing amendments and remarks, independent Claim 1 is believed to be allowable over the applied references. The other claims in the application are each dependent from the independent claim and are believed to be

allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendment and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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